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Stephen G. Bales

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STEPHEN G. BALES
17 HART LANE
SEWELL, NJ 08080

EXAMINER

DANIELS, MATTHEW J

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/681,497	Applicant(s) BALES, STEPHEN G.	
	Examiner MATTHEW J. DANIELS	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-12 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/20/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Prosecution Reopened

1. The BPAI affirmed-in-part rejections set forth on 1 December 2006 and made a new rejection of Claim 1 under 37 CFR 41.50(b). Applicant responded with claim amendments and evidence on 20 March 2008, and a supplemental listing of claims was provided with appropriate status identifiers on 4 April 2008. Prosecution is reopened on all pending claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1, 3-5, 10, and 16** are rejected under 35 USC 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Chow (USPN 5130352). **As to Claims 1 and 3**, Chow teaches incorporating an amount of boron containing material (boric acid, 4:38-45) in quantities which overlap with the claimed amount, used in a composite product containing lignocellulosic material (4:13) and thermoplastic (4:5-11). In the event that it is ultimately determined that there is insufficient specificity to anticipate the claimed range, Chow teaches that the boric acid provides a particular result of suppression of colour-darkening and odour suppression, and therefore would have been a result effective variable that one would optimize to arrive at the claimed amount. **As to Claim 4**, see wood 6:15. **As to Claim 5**, see polyethylene, 4:5. **As to Claim 10**, see 4:38-45. **As to Claim 16**, Chow teaches forming a

Art Unit: 1791

composite product of a thermoplastic (10:12), a lignocellulosic (10:29-30), and a material that would inherently or obviously act as a compatibilizer (maleic anhydride is a “grafting monomer”, 10:35-36, which acts as a compatibilizer). The composition further includes an amount of the claimed amount of boric acid (4:38-45) which overlaps with the claimed amount. In the event that it is ultimately determined that there is insufficient specificity to anticipate the claimed amount, the boric acid amount clearly represents a result effective variable that one would optimize to within the claimed range.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. In view of the multiple species claimed (zinc borate, boric acid, colemanite, different polymeric materials) and the differing scope of Claims 1 and 16, multiple rejections were required.

4. **Claims 1, 3-6, 8-12, and 14**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida (USPN 5221781) in view of Lloyd (USPN 6368529). **As to Claim 1**, Aida teaches a method for forming lignocellulosic thermoplastic composite products comprising incorporating an amount of boron-containing fungicide prior to forming the composite product (3:39-55, 6:18-21, 6:62-7:20) and a variety of inorganic fillers (cols. 5-6).

Art Unit: 1791

Lloyd teaches calcium borate (Abstract), which is used interchangeably and as a substitute for zinc borate and acts as a filler. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Aida because (1) Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment (9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates, or (2) Aida suggests a variety of fillers (cols. 5-6), and Lloyd provides an inorganic colemanite filler that would provide the additional benefit that it would resist pests and fungi.

As to Claim 3, Aida teaches the following ranges:

100 parts resin (6:24-25)

5-200 parts organic fillers including wood powder (6:19-25)

5-200 parts of compounds including zinc borate (7:12-15, 6:67)

Aida lacks sufficient specificity to anticipate the claimed range. However, the claimed range would have been prima facie obvious over Aida's teachings to use the materials in combinations of two or more (7:4-5 and 7:33-34) and to adjust these ranges (7:12-28), making the amount of zinc borate a result-effective variable. Values within these ranges, such as 100 parts resin, 100 parts organic fillers, and 7 parts zinc borate, would fall within the claimed zinc borate range (7 parts zinc borate amounts to 3.4% by weight). **As to Claims 4 and 5**, Aida teaches at least wood and polyethylene (6:19 and 3:39-45). **As to Claim 6**, Aida is silent to calcium borate. However, Lloyd teaches calcium borate (Abstract). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the

Art Unit: 1791

method of Lloyd into that of Aida because Lloyd teaches that an additional advantage of producing products with calcium borate in place of conventionally used zinc borate is that the calcium borates (a) have much better flow properties, making them easier to store and handle in processing equipment (9:1-5) and (b) cause less premature wear and failure (1:52-55), and (c) are less toxic than the zinc borates. **As to Claims 8, 9, 11, and 12**, Lloyd teaches at least calcium polytriborate (3:39) that is either natural or synthetic (3:39-41), and colemanite (3:30-45, especially 3:41). **As to Claim 10**, Lloyd teaches that “Borates such as boric acid...are well accepted as wood preservatives.” (1:32-36) Therefore, Lloyd teaches that boric acid is a conventional wood preservative, and would have been obvious as a material to be also included in the Aida process. **As to Claim 14**, Aida teaches at least zinc borate and wood (6:67 and 6:19).

5. **Claims 1, 3-5, 6, 8, 9, 11, 12, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Touval (USPN 3926883) in view of Pelikan (USPN 4104207). **As to Claim 1**, Touval teaches forming a thermoplastic product which comprises incorporating an amount of boron containing material which inherently acts as a fungicide in an amount between 2-12% of the article (7:30-60). Touval appears to be silent to the lignocellulosic material, however, such composites are conventional and well known to those skilled in the art. See Pelikan (Abstract, lines 1-3, 6:19, 6:39-53).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pelikan, the method comprising incorporation of lignocellulosic filler, into that of Touval because (1) doing so would provide reinforcement (increased strength) and a foaming agent (decreased weight), and because this technique

Art Unit: 1791

(lignocellulose as a reinforcement or carrier for blowing agent), is a conventional technique in the art that one would have found it obvious to apply to the Touval method, and (2) Touval suggests foams (Example 5), and Pelikan provides the ability to foam by using the lignocellulose reinforcement as a carrier for a foaming agent.

As to Claims 3-5, 6, 8, 9, 11, 12, and 15, Touval teaches polyvinyl chloride (8:18) which is a thermoplastic, and colemanite (Table 1, column 7, colemanite is a naturally occurring calcium borate) used in an amount of 3-5% (Table 1, samples 7-8), which would inherently provide the claimed degree of resistance to visual impairment. Additionally, the amount of colemanite is clearly a result effective variable that one would optimize to arrive at the claimed range which is not substantially different than the amounts disclosed by Touval in Col. 7. Pelikan clearly suggests pine wood as a lignocellulosic material (6:66).

6. **Claims 1, 3-6, 8-12, 15, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Lloyd (USPN 6368529). **As to Claims 1 and 16**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. Although silent to the borate materials, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan

Art Unit: 1791

provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31). **As to Claims 3 and 6, 8, 9, 11, and 12**, Lloyd teaches the claimed amount (3:45-62) of naturally occurring colemanite (calcium borate). **As to Claim 10**, Lloyd teaches that “Borates such as boric acid...are well accepted as wood preservatives.” (1:32-36) Therefore, Lloyd teaches that boric acid is a conventional wood preservative, and would have been obvious as a material to be also included in the Aida process. **As to Claims 4, 5, 15**, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and PVC as a thermoplastic (6:19).

7. **Claims 1, 3-6, 8-12, 15, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Borogard ZB (of record, 3/20/08 IDS). While it is noted that the IDS appears to cite the Borogard ZB sheet as having been published July 26, 2003, the document states on its face that it was “Accepted” on July 26, 1993. The 2003 citation in the IDS is believed to be a typographical error. **As to Claims 1 and 16**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. Although silent to the zinc borate, Borogard ZB

Art Unit: 1791

teaches incorporation of zinc borate at a loading of 3-20 parts or 0.5 to 8% for use as a biocide and fire retardant (phrase below title, also Plastic and Rubber Products and Wood Composite Materials section on Page 2 of 3). This quantity reads on the claimed amount of zinc borate.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Borogard ZB into that of Pelikan because (1) Pelikan provides a PVC material incorporating wood, and Borogard ZB expressly suggests the zinc borate for use with PVC, plastics, and wood composite materials, and/or (2) the calcium borate of Borogard ZB would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31). **As to Claims 3, 11, 14**, Borogard ZB teaches zinc borate and suggests that it be incorporated into plastics and wood composites in the claimed amount (Page 2 of 3). **As to Claims 4, 5, 15**, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and PVC as a thermoplastic (6:19).

Response to Arguments

8. Applicant's arguments filed 20 March 2008 have been fully considered but they are not persuasive or are moot in view of the new grounds of rejection set forth above. The arguments appear to be on the following grounds:

a) The present invention would produce unexpected results. No prior art existed prior to this application that described the mold resistance of a boron-containing fungicide in lignocellulosic thermoplastic composites. It is remarkable that borate-containing fungicides managed to retard mold growth.

Art Unit: 1791

b) A study performed by Dylingowski concluded that zinc borate did not prevent mold growth in laboratory tests and that 1% did not resist a culture of *Aspergillus*. Thus, Dylingowski, as one skilled in the art concluded that zinc borate is not effective in restraining mold growth on wood plastics.

c) Laks validated the results of the present study in a 2005 publication.

d) The lack of a fungicide's mold resistance effectiveness is a good indicator that it will not work well in lignocellulosic thermoplastics. Koskiniemi indicates that synthetic calcium borate had to be modified to provide mold protection and that colemanite did not provide this protection in the short term. In this reference, 2% colemanite provided no remarkable result. Modified calcium pyroborate did provide mold resistance, but required coating with silica.

e) The prior art shows that zinc borate is ineffective in providing lignocellulosic mold resistance, and is somewhat effective in providing (resisting) lignocellulosic mold. The prior art shows that a number of skilled inventors tested borate loading in wood plastics at the claimed amounts in a 2006 publication. Their teaching (relied upon as evidence in this case) that the addition of boron-containing chemicals to provide resistance to surface impairment, carries significant weight.

f) Amended claims 10 and 15 and new claim 13 (now 16) remove elements existing in the prior art.

g) Use of colemanite in the claimed amount would render Aida unsatisfactory for its intended purpose. However, other references teach that colemanite and ulexite would not effectively serve as flame retardants in those ranges.

Art Unit: 1791

9. These arguments are not persuasive for the following reasons:

a) The references now cited suggest there is no unexpected result, or if the result is unexpected, that it was provided using conventional amounts of the claimed materials in a manner that would flow naturally from the prior art. The Borogard ZB reference, which is highly material to patentability, suggests the claimed amounts of zinc borate. The results asserted as unexpected would appear to flow naturally from the prior art when the zinc borate is used as directed by the product brochure. It is requested that the appropriate publication date of the Borogard ZB reference be stated for the record since the dates listed on the document and the date listed by the IDS are contradictory.

b) While 1% is asserted not to provide the beneficial or unexpected result, this is not what is disclosed by the product brochure or the other references cited above. For example, Borogard ZB teaches 2-30 phr (parts per hundred resin). Thus, the prior art suggests higher levels than the results pointed to as unsuccessful. It is noted that a substantial effort has been made to distinguish the different types of degradation that may occur in wood plastic composites. However, Borogard ZB is non-limiting in its suggestion to use the material as a “Biocide”, and thus the result appears to flow naturally from the compositions suggested by the prior art.

c) Laks appears to have no bearing on the references now cited, which show knowledge of colemanite, zinc borate, and boric acid prior to the effective filing date of this application.

d) The Touval reference rebuts this assertion, and shows use of colemanite in a PVC, as claimed. Lignocellulosic fillers are conventional for use with thermoplastic materials.

e) The prior art shows that zinc borate is a biocide, and the recognition of additional properties for a known and conventional material does not weigh towards patentability.

Art Unit: 1791

f) These claims have been addressed above.

g) It has been discussed previously that Aida teaches materials used in combination, therefore it is not clear that the combination would make the Aida material unsatisfactory. Additionally, Aida suggests other inorganic fillers (cols. 5-6), and in view of the organic component of Aida, one would have found it obvious to incorporate Lloyd's colemanite in order to also provide resistance to pests, as described by Lloyd.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
4/5/08